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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/779,834	02/09/2001	Robert Pearce	195128US-20	7000
22850	7590	11/03/2004	EXAMINER	
OBLON, SPIVAK, MCCLELLAND, MAIER & NEUSTADT, P.C. 1940 DUKE STREET ALEXANDRIA, VA 22314			HARTMAN JR, RONALD D	
			ART UNIT	PAPER NUMBER
			2121	

DATE MAILED: 11/03/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.		Applicant(s)	
	09/779,834		PEARCE ET AL.	
	Examiner		Art Unit	
	Ronald D Hartman Jr.		2121	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 July 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-69 is/are pending in the application.
- 4a) Of the above claim(s) 25-69 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-16, 19 and 24 is/are rejected.
- 7) ☒ Claim(s) 17, 18 and 20-23 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>9/3/2003, 11/5/2003</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. This action is in response to the communications filed on 7/28/2004.
2. Claims 1-24 are presented for further examination, as per the applicants election of group I, in the Election filed on 7/28/2004.

Claim Objections

3. Claim 16 is objected to because of its use of "can be" in line 4. This language is not proper since it is indefinite since the feature may or may not be present in the claim.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1, 4-6, 12 and 24 are rejected under 35 U.S.C. 102(b) as being anticipated by Aoyama et al., U.S. Patent No. 5,990,638.

As per claim 1, Aoyama et al teaches a motion control system comprising:

- a central controller (i.e. Figures 1 or 2, element 10; "CNC Device") configured to generate first and second demand control signals defining actuation motion of respective first and second actuators (i.e. Figure 1, elements M1 and M2);
- first and second slaves in communication with the central controller (i.e. Examiners Note: the "slave" is interpreted to be the same as the combination of the servo-amp and the motor), each slave comprising:

- at least a respective one the actuators configured to implement, at an actuator time, an action based upon the respective demand control signal (i.e. Figure 1 element M1 using signals issued by the CNC device);
- a memory configured to store at least one respective propagation delay parameter related to a signal propagation delay between the central controller and each of the first and second slaves (i.e. Figure 3, element "correction value 1" and "correction value 2" and C4 L56-63);
- a timing mechanism configured to establish timing at each slave based on the respective propagation delay parameters, said timing mechanism configured to delay reception of a servo clock message at said first and second slaves by an amount of time corresponding to the propagation delay parameters for information passed from the central controller to the first and second slaves so that the actuator times at each of said first and second slaves occur simultaneously (i.e. the use of the timer circuit, Figure 3 element 206 and the "correction values" so as to allow the actuator to moved at the same time, claim 1); and
- a data network configured to place the first and second slaves in communication with the central controller (i.e. inherent to the disclosed capabilities and or functions disclosed by Figure 2 and the reception and transmission of data to and from the CNC device, since there must be some type of network in order for the signals to passed from one device to another).

As per claim 4, Aoyama et al teaches the use of a current controller (i.e. the servo amplifiers sending out a command voltage, Figure 1 element VC1 or VC2).

As per claim 5, Aoyama et al teaches the central controller (CNC device) comprising a synchronization signal generator (i.e. C1 L30-36) and the timing mechanism comprising a synchronization signal receiver (i.e. Figure 3 element 202).

As per claim 6, Aoyama teaches the use of an adder (i.e. Fig. 3 element 205).

As per claim 12, Aoyama et al teaches that the central controller comprises a master controller (inherent to the CNC device being used a master machine (i.e. Figure 13, element "master machine").

As per claim 24, Aoyama et al teaches a timing mechanism in each slave (i.e. Figure 3 element 206 which is located in each slave, which as already mentioned is comprised of the motor and the servo amplifier).

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 2-3 and 9-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Aoyama et al, as applied to claim 1 above, in view of obviousness.

As per claims 2 and 3, although Aoyama et al does teach the use of feedback signals, which are representative of the motion of the first and second actuators (i.e. Figure 1 elements "Pf1" and "Pf2"), which are communicated back to the central controller (i.e. CNC Device, Figure 1 element 10), Aoyama et al does not specifically teach the use of a transducer which emits the feedback signals. However, since a transducer is known to be used for providing a position signal, the use of the pulse coders (Figure 1 elements P1 and P2) would obviously accomplish the same function and provide the claimed feedback signal that is so vital for accurate synchronization of the first and second actuator. Therefore, for at least this reason, the use of the pulse

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coders is believed to be an obvious variation, or rather implementation of the system in place of the transducers since they both are used to accomplish the same function, that is, to provide a feedback signal so that the CNC device may effectively control the first and second actuator at the same time.

As per claim 9, Aoyama et al teaches the central controller (CNC device) comprising a synchronization signal generator (i.e. C1 L30-36) and the timing mechanism comprising a synchronization signal receiver (i.e. Figure 3 element 202).

As per claim 10, Aoyama teaches the use of an adder (i.e. Fig. 3 element 205).

8. Claims 7-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Aoyama et al, as applied to claims 5 (for claims 7-8) and 10 (for claim 11) above, in view of Oedl et al., U.S. Patent No. 6,011,367.

As per claims 7-8 and 11, Aoyama et al does not specifically teach the slaves utilizing their own local clock so as to allow synchronizing to the master clock.

Oedl et al teaches a servo control system wherein the slaves (i.e. drive units, Figure 1, elements 11) comprise their own internal local clock (i.e. Figure 1 element 13) so as to allow for synchronization to a master clock (i.e. C5 L45-60).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teachings of Oedl into the system disclosed by Aoyama for the purpose of allowing a simple way to synchronize the slaves (drive units) to the master clock so that the slaves may be actuated at the same time.

9. Claims 13-14 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Aoyama et al, as applied to claim 1, in view of Maxwell et al., U.S. Patent No. 5,508,909.

As per claims 13-14, Aoyama et al does not specifically teach a motion control system that is implemented using a ring and tree topology.

Maxwell et al. teaches a motion control system which is implemented on a network using a ring and tree topology (i.e. Figures 9-10).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teachings of Maxwell into the system disclosed by Aoyama for the purpose of minimizing transmission errors and where the distances between adjacent controllers is great (ring network) and when there is high capacity requirements for large number of controllers (tree network).

As per claim 16, the combined system of Aoyama et al (Aoyama et al in view of Maxwell et al) teaches a transmitter and receiver for use in the ring network (i.e. See Maxwell, Figure 9 elements 200 and 198, respectively, and C9 L20-25).

10. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Aoyama et al, in view of Maxwell et al., U.S. Patent No. 5,508,909, as applied to claim 14 above, and in further view of Tang, U.S. Patent No. 6,195,332.

As per claim 15, Aoyama's combined system (Aoyama in view of Maxwell) does not specifically teach the use of a full duplex ring network.

Tang teaches the use of a full duplex ring network for use in communicating between nodes connected on a network (i.e. C8 L25-42).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have incorporated the teachings of Tang into the teachings of Aoyama's combined system for the purpose of allowing for communications to occur in both directions.

11. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Aoyama et al, as applied to claim 1 above, in view of Watanabe, U.S. Patent No. 5,003,533.

As per claim 19, Aoyama does not specifically teach counting (auto-enumerating) the number of nodes (slaves) connected in the ring network topology.

Watanabe teaches node p[rocessing system whereby the nodes, which are connected in a ring network topology, are tracked by counting them as a message is passed around the network (i.e. claims 1 and 4).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have incorporated the teachings of Watanabe into the system disclosed by Aoyama for the purpose of allowing for the number of slaves to be counted so that when a particular node is to be addressed, it can be addressed with relatively little effort since the position (location) of each slave will be known.

Allowable Subject Matter

12. Claim 17 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

As per claim 17, the prior art of record fails to teach a motion control system for use in a servo control system wherein actuators of a first and second slave are synchronized so as to allow for both to move at the same time based on operations commands issued by a master controller, wherein the system utilizes a ring network topology and the central controller of the ring network comprises an identifier configured to identify a furthest slave along the ring network in a forward direction from which an answer is received at a receiver, in combination with the other claimed features and or limitations as claimed by the claimed invention.

13. Claim 18 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

As per claim 18, the prior art of record fails to teach a motion control system for use in a servo control system wherein actuators of a first and second slave are synchronized so as to allow for both to move at the same time based on operations commands issued by a master controller, wherein the system utilizes a ring network topology and wherein a propagation delay parameter contained in a memory comprises a forward path delay portion and a reverse path delay portion, in combination with the other claimed features and or limitations as claimed by the claimed invention.

14. Claims 20-23 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

As per claims 20-23, specifically dependent claim 20, the prior art of record fails to teach or adequately suggest a motion control system for synchronization of plural servomechanisms (slaves) wherein the central controller comprises a query message transmitter, an answer message receiver, a query message receiver and an answer message transmitter, in combination with the other claimed features and or limitations as claimed by the claimed invention.

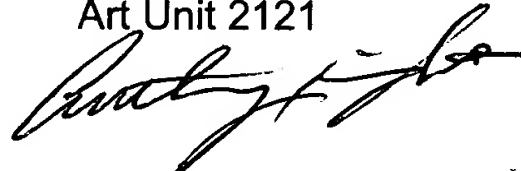
Conclusion

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ronald D Hartman Jr. whose telephone number is (571) 272 - 3684. The examiner can normally be reached on Mon. - Fri., 11:30 am - 8:00 pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Anthony Knight can be reached at (571) 272 - 3687. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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